

## Small Scale, High Value: *Gnetum africanum* and *buchholzianum* Value Chains in Cameroon

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**Abstract** The leaves of these *Gnetum* spp. lianas have long been harvested from humid forests for consumption and traded as a popular vegetable across the Congo Basin. Recent data on the current environmental, social and economic aspects of this forest product are however sparse. Value chain analysis was used to gather information on stakeholders involved in the chain from forest to consumer (small scale harvesters, traders, transporters, exporters and consumers), and on the socio-economic values, volumes, sustainability and governance in major production areas and markets in Cameroon and Nigeria. At least 2,550 people work across the chain, which has seven main routes from forest to consumers. *Gnetum* contributes on average to 62% of a harvester's annual income (1,125 US\$). Dependence upon *Gnetum*-based incomes increases for those further from the forest, providing an average of 75% of retailer's (1,268 US\$) and 58% of exporter's annual incomes (7,000 US\$). The better organised Nigerian wholesalers earn almost double their

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Cameroonian counterparts. Simple processing neither adds much value nor greatly reduces perishability. Whilst a rudimentary regulatory framework exists, trade is mostly illegal. Sporadic customary governance does not fill the void left by unenforced and inappropriate regulation. Over 50% is unsustainably collected from the forest and harvesting over the last 5 years increased as demand rose, particularly from Nigeria. Decreasing availability, increasing prices and low levels of cultivation have led to an unsustainable trade. Policy measures such as linking chain stakeholders, promoting cultivation, pragmatic regulation and enforcing customary control may enhance long-term survival of these IUCN Red List near-threatened species and ensure the continuity of their contribution to livelihood and economic development to continue.

**Keywords** Non-timber forest product · Value chain analysis · Livelihood · Trade · Sustainability

## Introduction

Cameroon has a large forest cover area, medium–low level of development and almost half the population living in rural areas with low levels of infrastructure (UNDP 2009; de Wasseige et al. 2009). In this context, non-timber forest products (NTFPs) provide diverse benefits for subsistence use and trade (Ambrose-Oji 2003). In 1998, NTFPs in Southwest and Northwest Cameroon were valued at US\$ 19 M (CERUT-AIDEnvironment 1999) and in 2009 just five NTFPs markets were worth US\$ 54 M, employing 45,000 people and contributing an average of 40% to harvesters incomes, with 20% of harvest consumed and the remainder traded (Ingram 2009), providing more employment than the formal and informal timber sectors (Lescuyer et al. 2011). Harvesting and trading NTFPs is largely informal and small in scale (Chupezzi et al. 2009). As the value of NTFPs is increasingly recognized, they have moved up the political agenda in relation to poverty reduction and conservation. Achieving and balancing these dual objectives is however extremely difficult (Kusters 2009). Growing demand leading to high value products intensifies stress on wild populations, increasing the likelihood of over-exploitation, leading to local extinctions (Clark and Sunderland 2004).

An example of such tensions, are leaves of the dioecious forest liana known as *afang* and *okazi* in Nigeria, *eru* and *okok* in Cameroon, plucked from *Gnetum africanum* Welw (Fig. 1) and *Gnetum buchholzianum* Engl. (Fig. 2). The species are ranked among the 10 most important NTFPs in Congo Basin countries, and in the 19 most used and valued NTFPs in Cameroon (Ingram et al. 2012). Both species are morphologically highly similar, growing to about 10 m. They co-exist in the same ecological niche, of densely shaded under-story of wet, primary lowland tropical and swamp gallery forests across Central Africa, often near slow-moving rivers (Clark and Sunderland 2004). Both are Red List classified as near threatened (Lakeman Fraser and Bachman 2008; Baloch 2009).

In Cameroon and Nigeria, the *Gnetum* leaves are used mainly for food, being highly nutritional (Mialoundama 1993; Abia et al. 2007; Mensah et al. 2008). They

**Fig. 1** *Gnetum africanum***Fig. 2** *Gnetum buchholzianum*

are eaten cooked and fresh by almost all societal strata, occasionally distilled into alcohol (Nkefor et al. 2000), and often served at culturally important ceremonies (Mialoundama 1993). The leaves are traditionally used to treat enlarged spleen, herpes, to ease childbirth, sore throats, hangovers and as a cathartic (Fondoun and Tiki Manga 2000; Clark et al. 2004; Jiofack et al. 2008; Mensah et al. 2008).

A value chain denotes how often economic and financial values change with the activities involved in bringing a product from the forest, through processing and production, to delivery to final consumers (Kaplinsky and Morris 2000). When NTFPs move from subsistence use to commercialization, the livelihoods of the stakeholders involved, including harvesters, processors, traders and consumers,

become interlinked through demand and supply interactions that have led to concerns about unsustainable exploitation and conservation (Shiembo 1999; Clark et al. 2004).

Studies of these taxa addressed taxonomy, nutritional content and state-of-knowledge. However, much of the data on *Gnetum* use and trade are now over a decade old, concern only parts of the value chain or specific geographical areas, and are largely lacking for the Southwest and Littoral Regions of Cameroon (Ndoye et al. 1998). The economic, environmental and social value for all chain actors has not been fully elaborated, making governance difficult, particularly when poverty reduction and livelihoods are key elements of the national forestry policy. This research thus aims to fill these gaps by holistically analysing the *Gnetum* spp. value chain and how governance affects its sustainability.

### Study Area and Research Method

Interviews were conducted with international organizations, research institutes and government, and government trade data and literature were reviewed. These were used to delimit the Southwest and Littoral regions (Fig. 3) as one of the major *Gnetum* production areas in Cameroon, located in the Lower Guinean tropical humid broadleaved forest zone. A situation analysis was first conducted to purposively select 18 villages where *Gnetum* is harvested, with half classified as having ‘easy’ and half as having ‘difficult’ access to markets (see Table 1). Fieldwork was conducted between March 2009 and February 2010 using semi-structured questionnaires tailored to chain activities. Rapid field assessments were conducted in each village and market to determine the target populations. A 25% random sample of harvesters in each village resulted in total sample of 76 harvesters.

The value chain was then traced to markets in the Southwest and Littoral regions of Cameroon. Using the market typology of Ruiz-Pérez et al. (2002), six retail



**Fig. 3** Map of study area villages and markets in Cameroon and Nigeria

**Table 1** *Gnetum* harvester's annual average profit and per kg profit per village

Region	Division	Village	Access to market D = Difficult E = easy	Average harvester profit 2007–2009 (Naira)	Average profit 2007–2009 (Naira/kg)
Southwest	Manyu	Kembong	E	495,453	181
		Eyomojock	D	285,480	27
		Nchang	D	360,311	164
		Okoyong	E	167,110	185
		Bache	E	605,748	305
		Tapkwe	D	713,558	174
		Bachuo-akagbe	E	1,294,453	168
		Etoko	D	472,200	87
	Kupe- Muanenguba	Ekenge	E	411,897	242
		Mungo Ndor	D	3,333	67
	Ndian	Ekombe Liongo	E	596,800	238
		Ekombe Mofako	D	256,000	233
	Subtotal			471,862	179
Littoral	Mungo	Souza	E	484,225	168
		Mbonjo II	D	476,480	155
		Bonamateke	D	609,707	180
		Nkapa Camp	E	509,933	170
		Mbanga	E	447,898	122
		Mojuka	D	505,000	93
	Subtotal			505,541	148
Average			497,996	163	

Extrapolated from 4 months data in SW and 6 months in Littoral for 2009

markets and one wholesale market were selected, based on accessibility and trade importance, where 64 retailers, 17 exporters, four wholesaler traders and five restaurant managers were interviewed. These represent a 25% random sample of target groups per market. Six markets in Yaoundé and Douala (Centre and Littoral regions) were surveyed to determine whether *Gnetum* from the study areas was traded there. Three processing enterprises and two nurseries were visited and their operators interviewed. The value chain was followed to Ikom and Calabar markets in Cross River state and Oron in Akwa Ibom state, Nigeria, where 13 traders were interviewed. A total of 184 individuals were interviewed. Interviews were conducted in English, pidgin and local dialects and guided by a questionnaire. Data were obtained on household and value chain stakeholder characteristics, seasonal activity calendars and qualitative and quantitative economic, social, governance and environmental aspects of the stakeholders' involvement in *Gnetum* chain for the period 2007–2009. Eleven focus group meetings in harvesting villages generated general socio-economic information and verified interview data. Market and forest surveys and interviews with government officials, market managers, NGOs and development organisations, helped triangulate interview data. Local field

units of measuring *Gnetum* traded were converted into metric units and financial values standardised.<sup>1</sup> Data were analysed using SPSS (v.16) and Excel. Profit margins (calculated using mean revenues less actual costs provided by respondents. Costs do not include labour unless hired labour was paid for) were calculated using average prices and costs per actor. Average annual figures are based on reported actual quantities, costs and prices.

## Results and Discussion

### *Gnetum* species Morphological and Ecological Variations in Cameroon

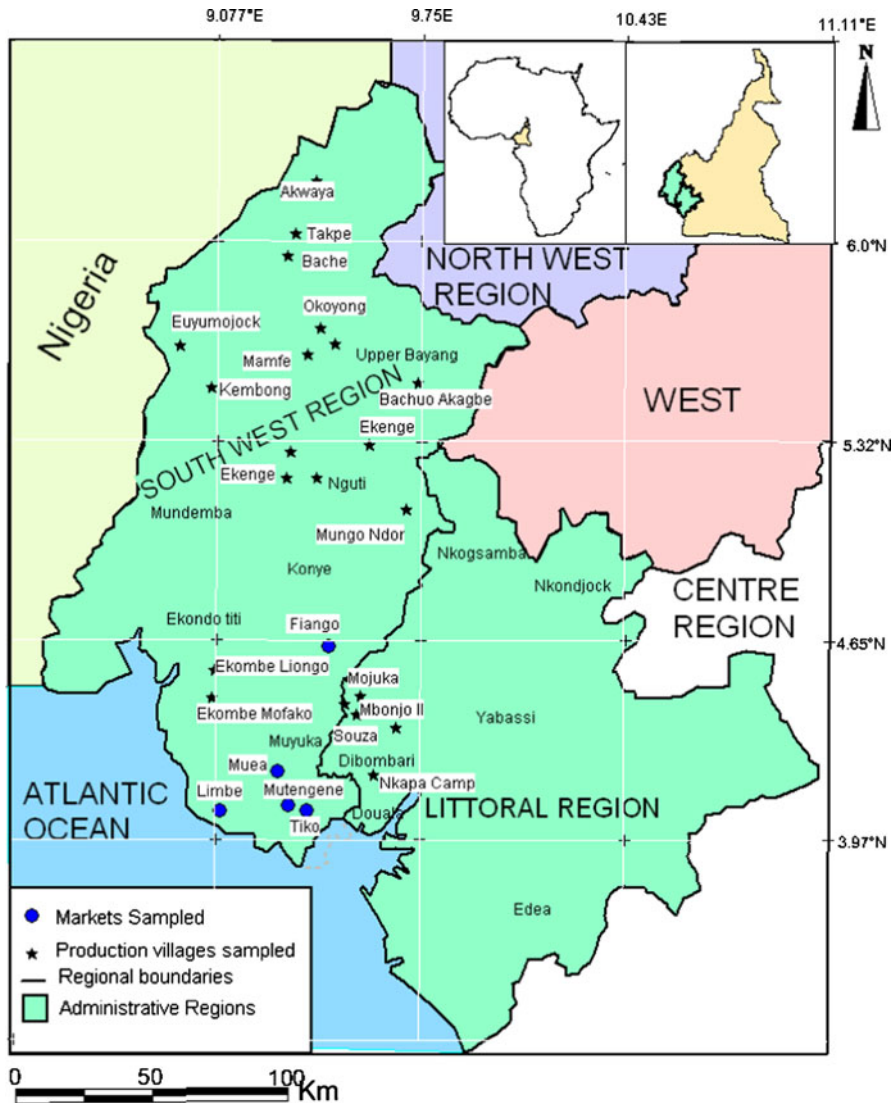
Although both *G. buchholzianum* and *G. africanum* vines occur in the study area, only 16% of harvesters could distinguish between species. The former is found mainly in primary forest, predominantly in Ndiang division. The rigid, broad, dark green large leaves of this species provide a higher yield per vine and make it easier to pick and slice. *G. africanum* has lighter green to yellow/reddish coloured, narrower, elongated leaves, and is found more frequently in secondary forests, and predominantly in Meme and Manyu divisions. Both species are gathered and are traded as a single product using the same local name.

### *Gnetum* Chain Actors and Livelihoods

At least 2,150 people are directly and 400 indirectly employed in the value chains originating from the two regions in Cameroon, in seven main channels (Fig. 4). The main circuit from the Southwest harvest areas of Bachuo-Akagbe, Kembong, Eyomojock, Etoko, Ekenge and Ekombe, and Souza and Mbanga in Littoral region. One route flows to local, rural small volume (Type I) and medium sized, domestic markets (Type II). Higher volumes are channelled to the urban markets of Kumba, Mutengene, Buea, Tiko and Limbe (Type III). A third major volume exports route extends to three Nigerian markets (Type IV) and subsequently to at least 10 other Nigerian (Type III and II) markets.

At least 759 harvesters in the 18 villages gather *Gnetum* leaves and transport them manually to their village or a forest-edge point of sale. Although available year round, collection is mainly in the dry and agricultural low-activity season, and festive periods. In the period 2007–2009 on average 3,386 kg was collected annually (Southwest 2,473 kg, SD 2.4, Littoral 3,662 kg, SD 0.9). This is a women's activity, viewed in the cultural context where cooking, farming and food marketing is a female task. A typical harvester is middle-aged, married with a household of five, primary school educated, travelling on average 5 km into the forest for a full days' collecting twice a week. Some take their children along. School children and students also harvest during holiday periods. Many women are

<sup>1</sup> The exchange rate as of February 2010 was 1 Nigerian Naira to 2.94 Central African Franc (FCFA) and 1 US\$ = 500 FCFA.



**Fig. 4** *Gnetum* value chain from the Southwest and Littoral regions of Cameroon

reluctant to travel to markets, due the lack of transport, high travel costs, long distances, and unwillingness to leave farm and family.

About 39% began collecting 5 years or less ago, on average 10 years (SD 8) with the longest 40 years, confirming the long history of use and trade indicated in literature. Most harvesters have diverse income sources, with NTFPs contributing on average 47% of annual household income, averaging 562,798 FCFA, equivalent to 163 FCFA per kg profit. There is however variance in profits across villages (Table 1). Other income sources include agriculture (43%) and up to five activities,



particularly trade, other NTFPs and fishing. *Gnetum* leaves comprise 62% of NTFP-based incomes, with 13 different NTFPs harvested in the Southwest and nine in Littoral region. The majority (93%) of harvesters, whilst collecting companionably with others, are not organised or registered enterprises and all sold individually.

Traders, known as middlemen or ‘buyam-sellams’, buy, store and transport *Gnetum* to markets. An estimated 175 traders are active in the area, travelling from 50 to 100 km over largely poor, unpaved routes to buy directly from individuals or village middlemen. Some Nigerian traders reportedly recruit young Nigerian men to harvest. About 40% of traders supply directly to retailers, exporters, importers or other agents, a third favouring specific retailers or purchase upon command, and 60% supply wholesalers. A typical trader is female, earning an annual average of 720,000 FCFA (1440 US\$). An estimated 141 managers, mainly Cameroonian, are commissioned by Nigerian unions, buying and transporting to border markets or into Nigeria. A manager typically organizes a team of young men with descriptive titles such as ‘loaders’, ‘off-loaders’, ‘counters’ and ‘waterers’. A manager earns on average 1.44 million FCFA (2,880 US\$) annually, this being their primary income source.

At least 542 retailers in markets in the Southwest and Littoral regions buy leaves in 1 kg bundles for on average 827 FCFA, reselling in 100 or 150 kg sacks, or processing them on the spot by slicing finely, selling on average at 1,357 FCFA/kg to households and restaurants. *Gnetum* is perishable, deteriorating within 4–6 days: if too moist, it rots and if too dry it shrinks and desiccates, in both cases becoming unsellable. Despite 91% of traders using storage techniques, annually on average 13% of stock deteriorates. Retailers were all found to be women, largely local, married with children, in their mid-thirties, educated to secondary school level, with a household of six. They specialize in *Gnetum* leaves although 31% have parallel trade in three other products, mainly agricultural, with on average 3.5 (SD 1.3) other revenue sources. *Gnetum* leaves contribute on average to 76% of annual household income. Although there is a wide variation between markets (Table 2), on average traders earn 729,327 FCFA (SD 351,780 FCFA) (1,458 US\$) annually. The average profit is 470 FCFA per kg. Approaching half of the retailers (42%) are union members, obtaining credit, social support and help in settling conflicts. The 152 retailers in the three Nigerian markets have comparable social profiles to their Cameroonian counterparts.

Processors transform *Gnetum* for immediate and long-term use. Four small enterprises with about 15 staff each were found to be engaged in this new and growing activity, slicing, air or oven drying and packaging. The Manyu Indigenous Spice Processing Ekemco Group (MISPEG) processes and sells dried and packaged *Gnetum* in Cameroonian cities and exports to Europe and the USA, retailing at 1,000 FCFA per 250 g bag, with a profit of 150 FCFA/kg. Talesse, a small food processing company, markets dried *Gnetum* from the Centre and Littoral regions, selling at 650 FCFA/100 g in Yaoundé supermarkets. The Centre for Nursery Development and *Gnetum* Propagation (CENDEP) produces 100 g bags of dried *Gnetum*, with a profit of 500 FCFA/kg. The Limbe Botanic Gardens, CENDEP and MISPEG also operate nurseries, each employing approximately 12 part-time staff.

In the markets surveyed, 25 restaurants (with an estimated total of 63 staff) cook and offer *Gnetum*-leaf based dishes, mainly the popular ‘eru and water-fufu’



**Table 2** *Gnetum* retailer's average profit per kg and profit per annum (FCFA)

Year	Market						
	Muea	Limbe	Tiko	Mutengene	Fiango	Average profit	Standard deviation
Market type	II	II	I, IVI	II	II		
2007 Total profit	473,791	536,222	–	1,920,000	1,072,000	1,000,503	±669,221
Profit per kg	395	403	–	1,000	200	500	±347
2008 Total profit	650,809	561,333	1,099,200	1,400,900	799,200	902,288	±6,345,510
Profit per kg	340	486	1,000	571	189	517	±307
2009 Total profit	168,754	139,722	579,000	489,143	210,733	317,470	±201,850
Profit per kg	295	495	916	563	191	492	±281
Average profit per kg	343	462	639	711	193	470	±212
Average annual profit	431,118	412,426	839,100	1,270,014	693,978	729,327	±351,780

(fermented cassava). A portion of eru sells for 50 FCFA, the total dish 150 FCFA. Restaurants were run by women, typically married with two to three children, aged 30 with primary schooling and 6 person household, making an average profit of 550 FCFA per kilogram and average income of 740,087 FCFA (SD212).

Exporters or their intermediaries travel to border towns and ports, using 20 ton trucks and canoes with outboard motors. All 48 exporters incur losses, on average 26% of stock, despite 86% using storage techniques to prolong freshness. Exporters are typically married women (67%), with secondary level education and in their mid-30 s. Starting capital was obtained from *Gnetum*-based or other trading activities (66%) or borrowed (33%). Large-scale exporters, exporting to Oron via Idenau, make annual average profits of 3,060,393 FCFA (SD 8,147,254 FCFA) (Table 3). *Gnetum* leaves are the major income source, contributing to 58% of average household incomes, although 28% have on average three other sources, largely sale of agricultural products. *Gnetum* leaves pay for basic needs: food (22%) and children's education (26%).

In Nigeria, 152 importers purchase on average 51 tons of *Gnetum* each annually from Cameroon. Oron importers purchase on average 140 tons each. They sell to small-scale Nigerian wholesalers and retailers who, as in Cameroon, process into fine slices and sell to consumers. No processing enterprises were identified. The Nigerian trade conducted is entirely through unions, mirroring the federal system, with officially recognised, registered associations of *Gnetum* dealers in each state.

A large number of support actors are active in the value chains. An estimated 330 labourers work in the markets, with 150–250 young men working thrice weekly on

**Table 3** *Gnetum* exporter's total profits per annum

Market	Market type	Profit per annum by year (FCFA)				
		2007	2008	2009	Annual average	Standard deviation
Ikom	III	–	3,100,000	1,106,846	2,103,423	1,409,373
Average profit per kg			149	346	247	139
Ikang	III	33,360,000	10,800,000	930,000	434	16,623,655
Average profit per kg		579	563	160	9,358,400	237
Calabar	III	7,104,000	6,168,000	14,803,200	368	4,738,503
Average profit per kg		370	367	367	247	2
Oron	IV, III	–	57,148,750	n/a	n/a	
Average annual profit		20,232,000	6,689,333	5,613,349	10,844,894	8,147,255
Average profit per kg		263	118	30	212	118

eru market days in Idenau markets. Other stakeholders include knife and cutlass sharpeners, transporters, traditional authorities, police, gendarmes, quarantine and customs officials, staff of the Ministry of Commerce and Ministry of Forestry and Wildlife (MinFoF) and Councils collecting local market taxes.

### Production Quantity and Values

Annually an average of 2,324 tons was harvested in the 18 villages from 2007 to 2009; however, the total quantity decreased by 42% a year over the study period. The variations between villages (Fig. 5) are due to differences in number of harvesters, abundance of *Gnetum* and other NTFPs, alternative income generating possibilities and distance to market. On average, the majority harvested (83%) was sold. 11% was consumed (18% in the Southwest due to its popularity and culinary traditions), 4% given as gifts, and 4% deteriorated. The leaves were mostly eaten, with only 10% used medicinally. No *Gnetum*-based drinks were found in Southwest or Littoral Cameroon or Nigeria, although a *Gnetum* wine from Ebolowa is sold in Yaoundé.

The total quantity sourced from the study area and traded in the five Southwest markets averaged 528 tons a year (SD 138). Cameroon's main city, Yaounde, is not supplied from the study area but Centre and South regions. However, towns in the Southwest, Northwest and Littoral are provisioned from the study area. An estimated 3,464 tons annually flow through Idenau, the main export port. A further 18, 19 and 17 tons are exported annually through Ekok and Bota Wharf near Limbe and Ekondo Titi, respectively. These markets also receive large volumes from the Centre and South regions, because quantities from the Southwest have reduced, tallying with the findings of Awono et al. (2002).

Figure 6 shows how values change in the chain. Prices vary widely per market, being on average 76% higher in Muea and 42% lower in Fiango. Market prices peak by 6% in the dry season and fall from February to September attributed to seasonal

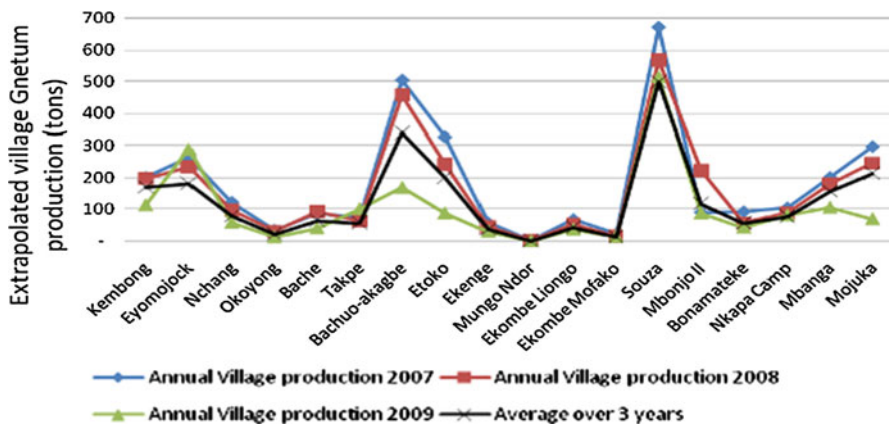


Fig. 5 Annual *Gnetum* harvest per village 2007–2009

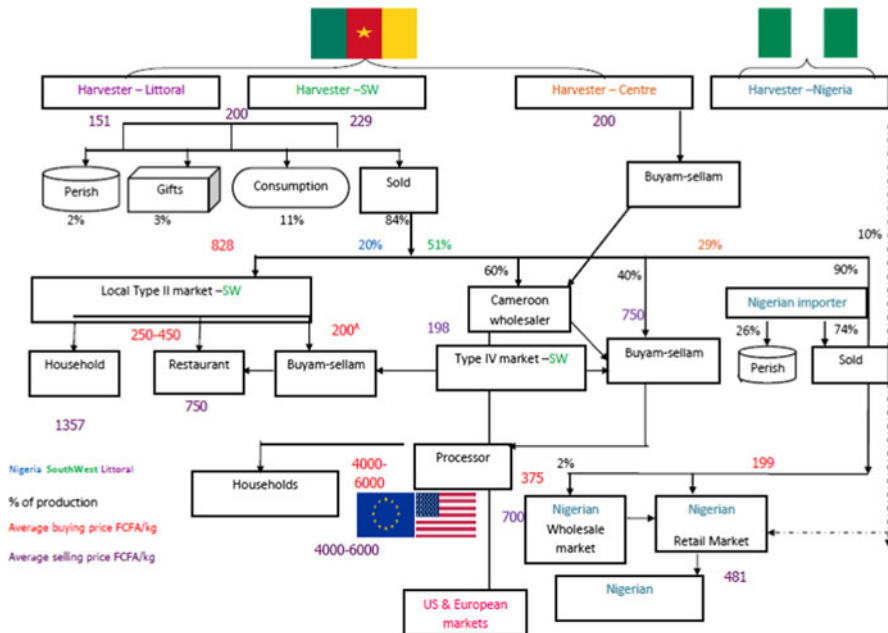
substitutability with other vegetables and NTFPs, ease of harvest, demands from other income generating activities affecting labour supply and cash demand, culinary preferences and increased supply during vacations when students harvest. On average Southwest and Littoral regions exporters sold 634 tons of *Gnetum* leaves in 2008. In the Nigerian markets, on average an estimated 3,467 tons of *Gnetum* leaves were imported annually, 83% via Oron. Fresh leaves traded in Europe are sourced from other regions of Cameroon. Dried, packed leaves from the Centre and Littoral regions are exported to diaspora on wholesale.

Apart from the buying price, exporters' costs include transport (23%), council and quarantine taxes (32%) and bribes to police and forestry services (37%). Nigerian wholesalers make higher profit margins (425 FCFA/kg) than their Cameroonian counterparts (232 FCFA/kg). This is explained by the Cameroon chain being un-organized, which reduces bargaining power. Poorer roads and longer journey time also increase product waste and financial losses. Higher corruption and taxes further reduce profits. A comparison of average profit margins of harvesters in groups and those working individually using a t-test did not reveal any significant statistical difference.<sup>2</sup> Those working individually have higher average profit than those in groups, ascribed to increased costs of domesticating *Gnetum* and less time spent harvesting, and existence of shared, group profits.

### Unsustainable *Gnetum* Trade

Currently the value chains are almost completely dependent upon wild sourced *Gnetum*. Harvesters reported that the majority (41%) of *Gnetum* spp. leaves are collected from primary or secondary forest and 21% from customary village-owned forest, with free and open access for the community. Smaller proportions are from

<sup>2</sup> Mean difference of 271, 367 with  $t = 1.0$  with equal variances assumed.



**Fig. 6** *Gnetum* value chains and prices from the Southwest and Littoral regions of Cameroon

private land<sup>3</sup> (17%), palm oil plantations (11%), protected areas (3%) and farmlands (6%). Only 16% of harvesters had ever planted *Gnetum*, half prompted by the opportunity to increase production, increasing scarcity and support projects. However the volumes produced form a negligible proportion of total production and most vines were not yet in production. The majority of harvesters (73%) indicated no knowledge of cultivation techniques, notwithstanding over a decade of domestication projects (Tanda 2009), promoted to take pressure off wild resources (Fondoun and Tiki Manga 2000; CENDEP 2008; Orwa et al. 2009). Despite promising farmer uptake and production (CENDEP 2008), *Gnetum* is not cultivated on a sufficiently large scale to change harvester or farmer practices or significantly increase total production. Whilst 40% of harvest techniques are sustainable, plucking leaves or climbing to harvest the youngest leaves, echoing findings of Fondoun and Tiki Manga (2000), 50% are not, involving uprooting, tree felling or cutting the whole liana. As a result, *Gnetum* is becoming scarcer. Most (97%) harvesters indicated that foraging distances have increased in the past decade, and that forests have diminished, attributed to clearance for farmland (68%), oil palm plantations (25%), and in Mungo, logging (7%). Nearly a quarter of harvesters (23%) indicated that longer search times and scarcity are their biggest problems. This parallels concerns since the 1990's of increasing trade and demand, destructive harvesting methods and deforestation (Sunderland et al. 1998; Shiombo 1999; Ndoye and Awono 2009). Whilst not differentiated by consumers, *G. buchholzianum* is

<sup>3</sup> Harvesters reported their source as 'private forest land', although legal title may not be held.

preferred by other chain stakeholders, but is less abundant in the study area and most prone to habitat loss, due to its primary forest preference. The quality of *G. africanum* was reported to diminish when forest cover is removed. Half of the traders and 67% of exporters indicated that stronger, darker, larger leaves are obtained from primary forests, and lower quality is associated with secondary forests, plantations or farmland origin. These threats together with rising population density, deforestation and degradation (de Wasseige et al. 2009) make the species vulnerable.

### Livelihood Importance of *Gnetum* Trade

Approximately 11,700 people benefit from *Gnetum* revenues, given a 5.9 average household size. It contributes on average to 67% of household incomes for harvesters, retailers, traders and exporters, for whom it has been an income source for on average a decade. Revenues are used to meet basic needs for all, providing a safety net particularly during low seasons of agricultural output. For harvesters, *Gnetum* is generally profitable, equivalent to 1,365 FCFA per day, which is just above the \$2 a day 'poverty line'. Although incomes vary due to distance to markets, seasons and bargaining power, profits of up to 57% are possible. The value of this product is increased by the fact that, unlike many NTFPs, it can be harvested and sold year round, is easy to collect and has well developed and multiple market channels. As the leaves are perishable, if not sold harvesters consume or barter it. Medicinal uses were little known, unlike in other Congo Basin areas (Schippers 2004; Schippers and Besong 2004) and Asia (Orwa et al. 2009), highlighting undeveloped potential. Its high nutritional content, cultural significance, medicinal benefits and economic value combine to make this a highly valuable product.

Forest dependence is commonly viewed as greatest for those living in or adjacent to forests (Wollenberg and Ingles 1998; Colchester 2008). However, actors towards the end of the *Gnetum* chains are more dependent than harvesters in terms of contribution to household revenue. Whilst exporters, traders and retailers gain higher profits, these stakeholders have fewer and less valuable sources of alternative incomes than harvesters. They are also the least informed and engaged in ensuring continued supply, largely unaware of the precariousness of their trade based on dwindling yet unknown supplies. Thus whilst *Gnetum* based livelihoods are currently profitable, their sustainability is highly questionable. Harvesters lower profits result from their lack of access to market information, reluctance or inability to travel to markets, lower negotiating power due to selling as individuals, limited ability to profitably increase production, and high perishability.

### Ineffective *Gnetum* Value Chain Governance

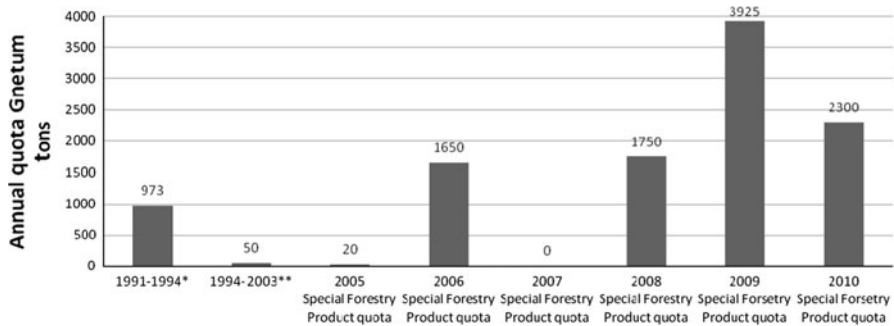
That unsustainable harvesting threatens livelihood values is largely due to how the chain is governed. Historically, these vines were consumed by specific ethnic groups (Poubom Ngundam 1997). In the last three decades consumers and trade has increased (Shiembo 1999), and trans-border markets grown (Clark et al. 2004; Ndoye and Awono 2009,). Markets have grown from an estimated 600 tons exported to Nigeria in 1993 (Bokwe and Ngatoum 1994), to 25,255 tons in 1998

(Ndoye et al. 1998). This trade is, in theory, regulated. Under the 1994 *Forest, Wildlife and Fisheries Law (No 94/01)*, all forests belong to the Cameroonian State. Adjacent communities have user rights for own (not commercial) use of forest resources. Many people however, are unaware of this and/or believe that forests belong to them and can be freely exploited for commercial use (Laird et al. 2010). To meet increasing demand, remoter areas were harvested in the late 1990s, leading to increasing scarcity in the Southwest (Shiembo 1999) and across Cameroon (Schippers 2004, Schippers and Besong 2004). In 1995, this trade led to *G. africanum* being declared as an endangered species and a ban considered (but never implemented) in 1999 (Fondoun and Tiki Manga 2000). Appearing on annual special forestry products (SFP) quotas since 2005, 'eru' was listed (literally, not the species name) as one of 13 SFP in 2006, requiring annual permits granted by MINFOP. In theory quotas are based on population surveys. In practice, they are allocated primarily to larger enterprises on a demand basis. Since 2005, 82% of all quotas requested were granted.<sup>4</sup> These enterprises are rarely harvesters but brokers, selling on quota waybills (documents monitoring SFP transport), a process dogged by corruption (Ndoye and Awono 2009). Just the volume reaching local Southwest and Littoral markets and Nigeria is 19% greater than the total national annual permitted quota (Fig. 7), which encompasses other major harvest zones in the Centre, East and South of Cameroon (Ndoye et al. 1998; Awono et al. 2002). Permitted quantities thus reflect demand rather than supply and have increased in the last five years. Despite the open and well-known international trade, *Gnetum* is not listed in the government database of exported forest products.

Comparing individual company permits with waybills also reveals significant over-exploitation by two companies in 2007 and 2008 and four in 2009. Interviews also confirmed a widespread lack of permits. Given that 79% of *Gnetum* in the study area harvested is sold, it is clear that most production is illegal and ungoverned. Traders indicated that even when possessing permits, corruption is common, amounting on average 25% of trader and exporter's costs. The hassle and delays can be ill afforded given the leaves perishable nature. The regulatory system thus works contrary to its objectives, inadequately monitoring and controlling trade, inefficiently collecting government revenues and allowing ample opportunities for corruption, with a difficult, un-transparent and inefficient permit allocation and waybill system; and not protecting a species deemed to be near threatened. Combined with the current lack of knowledge about the abundance and quantity of *Gnetum* across Cameroon, sustainable governance is impossible. Inventory and mapping of past and current production areas would help fill this gap, combined with a revision of the demand-based permit system. Notwithstanding proposals for regulatory and institutional reform promoting sustainable NTFP management since 2008 (Ebamane 2008) and specifically for *Gnetum* (Ndoye and Awono 2009), changes are still awaited.

Given the current lack of enforcement and low government presence in the area, unless significant political changes occur, any revision in regulations may have little impact on practices and quantities. Customary regulation also does not fill the voids

<sup>4</sup> Annual Special Forestry Products lists from 2005 to 2010.



**Fig. 7** Annual quota production quantities for *Gnetum* spp. in Cameroon 1991–2010. Sources: Fomete and Tchanou (1998)\*, Tabuna (1999)\*\*; ministry of forests and wildlife special forestry product quotas

in the formal system. Rights to *Gnetum* spp. are asserted only by 13% of land owners, community forests and village councils, in the form of payments for harvesting by outsiders. Whilst limiting access, sustainability is not ensured as customary rules do not specify harvest methods. Privately owned and planted *Gnetum* was reported as vulnerable to theft in the Southwest, being perceived as a wild, open access NTFP. This indicates how customary tenure and access rules have not yet fully adapted to the transition to cultivated, agro-forestry product. However, villages in the Southwest working with CENDEP reported that using traditional rules and institutions, enhanced collective action and domestication offered pragmatic solutions to over-exploitation. Combined with local quotas, sustainable harvest methods and ‘no-go’ or regeneration areas, these could form a multi-pronged approach to improve governance.

## Conclusions

The sale of leaves of the predominantly wild *Gnetum* spp. makes a substantial contribution to the livelihoods of actors in the value chain from the Southwest and Littoral regions of Cameroon. Because the majority of stakeholders are female (69%), and use *Gnetum* leaf revenues to meet basic needs for their households, the gender and development aspects of this trade are significant. Increasingly, however, this commerce is unsustainable. This is indicated by a declining resource of lianas with naturally low abundance, particularly of the favoured *G. buchholzianum*, combined with unsustainable harvest practices, increasing prices and continuing high demand, low levels of cultivation and clearance of natural forest habitat. *Gnetum* spp. are increasingly vulnerable in the Southwest and Littoral regions, due to a combination of the vulnerable ecological characteristics of the species, high harvest levels, unsustainable harvest techniques and a lack of regulatory control and enforcement. This situation has arisen despite repeated concerns of over-exploitation (Sunderland et al. 1999, Shiembo 1999). The near-threatened status of both species merits further research, action and possibly a higher protection level.



Governance issues are critical in this value chain. Weak formal regulations and insufficient or weak customary governance, the largely informal nature of trade and illegality are exacerbated by a regulatory and policy framework that undervalues the contribution of NTFPs to livelihoods and creates a highly disabling environment for sustainable exploitation. This combines with an easy and lucrative commerce, in part due to corruption, and high demand, offering diverse market chains that provide benefits to an estimated 11,000 plus people in Cameroon and Nigeria. This is a classic trade-off between livelihoods and development, and conservation, resulting in income but over-exploitation and long-term resource degradation.

Policy recommendations include revising the regulatory framework to better capture and monitor *Gnetum* spp. permits, particularly at major markets and border crossings. Government promotion and guidance on sustainable harvesting techniques and collaboration with customary authorities who could help enforce regulations in remote forest areas. Collective action, improved market information and storage techniques, domestication and cultivation, processing and packaging offer ways to redress this balance. Such measures have been shown to be effective in the study area to solve problems of perishability and add-value and increase harvester profits (Chupezi et al. 2009; Leakey 2011). Overcoming the lack of coordination between the Ministries of Agriculture, Forestry and Wildlife, Commerce and Customs with chain actors, research and development NGOs concerning trade and formally distinguishing cultivated from wild *Gnetum* spp. could further add to improved governance.

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